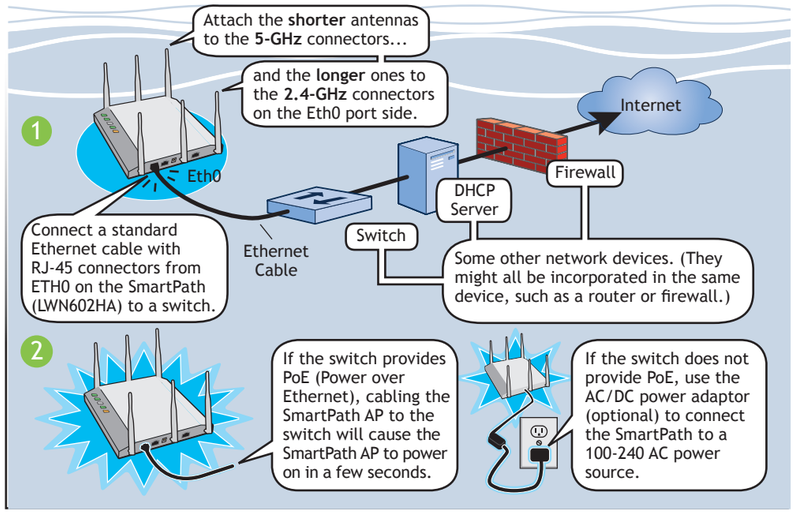
Black Box® QuickStart Guide for the SmartPath AP (LWN602HA)

This QuickStart guide explains how to set up a SmartPath access point (AP) (LWN602HA) so it can make a network connection to a switch, and how to mount it on a ceiling or wall.



Connecting to SmartPath EMS

3 Cable the SmartPath AP to an Ethernet network—a SmartPath AP connected directly to the network like this is called a portal—or place it within radio range of a portal so that it forms a wireless link through the portal to the wired network. This kind of SmartPath AP is called a mesh point. By default, a SmartPath AP acts as a DHCP client and gets its network settings automatically from a DHCP server. (You can also configure the SmartPath AP with static network settings through the CLI. See the next section, "Using the Virtual Access Console," for information about making a wireless—or "virtual"—console connection to the CLI on the SmartPath AP.)

A mesh point initially forms a cluster with its portal using the default cluster *cluster0*. Through this link, the mesh point can reach the network and get its network settings through a DHCP server. Then it can form a CAPWAP connection with the SmartPath EMS. (To add a mesh point after changing the cluster name, first connect it to the wired network. Next, push a configuration with the new cluster name to it from the SmartPath EMS. Finally, deploy it as a mesh point.

CAPWAP (Control and Provisioning of Wireless Access Points) is a protocol that access points use to contact a management device and communicate with it. After getting its network settings through DHCP, the SmartPath AP then acts as a CAPWAP client and tries to reach a CAPWAP server, which in this case is a SmartPath EMS Appliance. If the SmartPath AP is configured with the SmartPath EMS IP address or domain name or if it receives DHCP attributes specifying either a SmartPath EMS IP address or domain name, it uses those settings to contact it.

If the SmartPath AP is not configured with SmartPath EMS settings and does not receive them through DHCP, it then checks if it can do a DNS lookup to resolve "SmartPathEMS.<local_domain>" to an IP address ("<local_domain>" is the domain that the DHCP server assigned to the SmartPath AP).

Finally, if none of the previous efforts enables the SmartPath AP to contact the SmartPath EMS, the SmartPath AP broadcasts CAPWAP Discovery messages on its subnet. If the SmartPath EMS is in the same broadcast domain, it responds, and the two devices negotiate a secure CAPWAP connection.

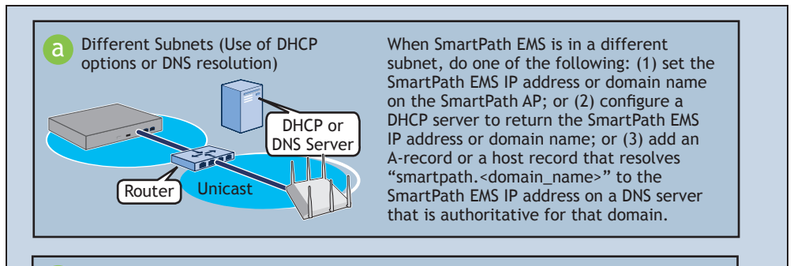
If SmartPath EMS is in the same subnet as the SmartPath AP, the SmartPath AP finds and connects to it automatically. However, if SmartPath EMS is in a different subnet from the SmartPath AP, you must configure settings on the SmartPath AP, the DHCP server, or DNS server so that one of the other SmartPath EMS discovery methods can succeed:

(1) Manually configure the SmartPath AP with the SmartPath EMS IP address or domain name.

(2) Configure a DHCP server to return the SmartPath EMS IP address or domain name in one of the DHCP options.

(3) Configure the local authoritative DNS server with an A-record or a host record that resolves "SmartPath EMS" to the SmartPath EMS IP address.

When the SmartPath AP has a specific IP address for the SmartPath EMS, it can then send unicast CAPWAP Discovery Request messages to it at that address.



Using the Virtual Access Console

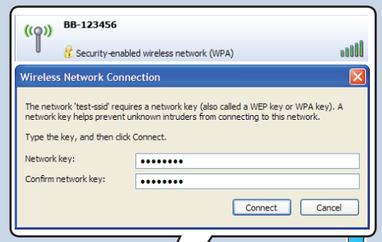
As explained in the previous section, after connecting a SmartPath AP to the network and powering it on, it acts as a DHCP client and tries to get its network settings automatically from a DHCP server in VLAN 1. However, if there is no DHCP server in that VLAN, if the native VLAN for the network segment is not 1, or if you just want to assign it a static IP address, then you need to access the Command Line Interface (CLI) and define the network settings yourself.

One approach is to use a console cable, which is available from Black Box as an accessory. Another is to use the virtual access console. This is a way of accessing the CLI on a SmartPath wirelessly through a special SSID that the SmartPath, by default, automatically activates for administrative access when it has no configuration and cannot reach its default gateway.

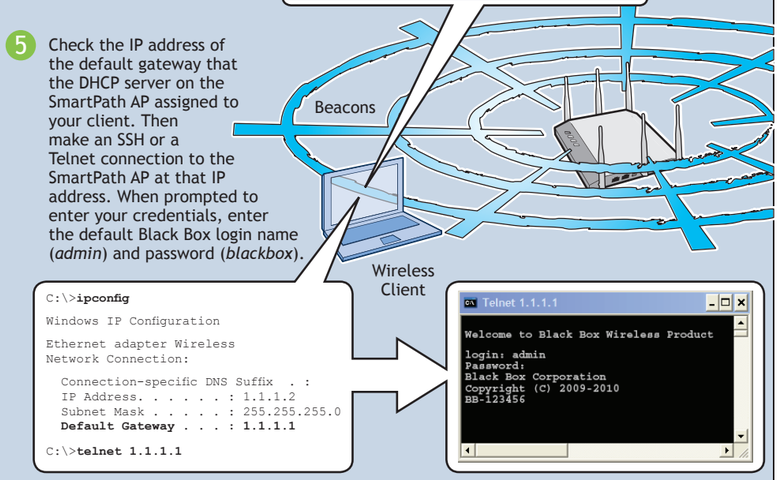
The default virtual access console SSID name is "<SmartPath-hostname>". The default host name of a SmartPath consists of "BB-" plus the last six digits of its MAC address; for example, BB-123456. In this case, the name of the default virtual access console SSID would be "BB-123456." By default, this SSID uses *blackbox* as the PSK (preshared key) for authenticating user access. To access the virtual access console, do the following:

4 Using your wireless client, scan for wireless networks. If you are within range, an SSID such as "BB-123456" appears.

Select it, and when prompted to enter a network key, type *blackbox* and then click **Connect**.



5 Check the IP address of the default gateway that the DHCP server on the SmartPath AP assigned to your client. Then make an SSH or a Telnet connection to the SmartPath AP at that IP address. When prompted to enter your credentials, enter the default Black Box login name (*admin*) and password (*blackbox*).



6 After logging in to the virtual access console, you can view the status of various functions and make configuration changes. Here are some commonly used commands.

Use these commands:	To do the following:
`show interface`	Check the status of both wired and wireless interfaces
`show interface mgt0`	See the network settings (IP address, netmask, default gateway) and VLAN ID of the mgt0 interface
`no interface mgt0 dhcp client`	Disable the DHCP client
`interface mgt0 ip <ip_addr> <netmask>`	Set the IP address and netmask of the mgt0 interface
`interface mgt0 native-vlan <id>`	Set the native (untagged) VLAN that the switch infrastructure in the surrounding wired and wireless network uses
`show capwap client`	See CAPWAP client settings and status
`capwap client server name <string>`	Set the IP address or domain name of the CAPWAP server (SmartPath EMS Appliance)
`capwap client vhm-name <string>`	Set the VHM (virtual SmartPath EMS Appliance) to which the client belongs
`show cluster`	See the cluster name
`show cluster <string> neighbor`	Check for any nearby cluster members
`clusters <string> ...`	Create a cluster and set its parameters
`show ssid`	See a list of all SSID names
`ssid <string> ...`	Configure an SSID
`interface { wifi0 | wifi1 } ssid <string>`	Bind an SSID to a wireless interface in access mode

To see a list of commands, and their accompanying CLI Help, type a question mark (?). For example, to see all the show commands, enter `show ?`

If you want to find a command that uses a particular character or string of characters, you can do a search using the following command: `show cmds | include <string>`, where `<string>` is the word or string of characters you want to find.

Device- and platform-specific CLI reference guides are available on-line. (To learn how to access them, see "Where to go for more information" elsewhere in this document.)

Status LEDs

The five status LEDs on the top of the SmartPath AP (LWN602HA) indicate various states of activity through their color (dark, green, amber, and red) and illumination patterns (steady glow or pulsing). The meanings of the various color and illumination patterns for each LED are explained below:

Power

- Dark: No power
- Steady green: Powered on and the firmware is running normally
- Pulsing green: Firmware is booting up
- Steady amber: Firmware is being updated
- Pulsing amber: Alarm indicating a firmware issue has occurred
- Steady red: Alarm indicating a hardware issue has occurred

ETH0 and ETH1

- Dark: Ethernet link is down or disabled
- Steady green: 1000-Mbps Ethernet link is up but inactive
- Pulsing green: 1000-Mbps Ethernet link is up and active
- Steady amber: 10-/100-Mbps Ethernet link is up but inactive
- Pulsing amber: 10-/100-Mbps Ethernet link is up and active

WIFI0 and WIFI1

- Dark: Wireless interface is disabled
- Steady green: Wireless interface is in access mode but inactive
- Pulsing green: Wireless interface is in access mode and active
- Steady amber: Wireless interface is in backhaul mode but inactive
- Pulsing amber: Wireless interface is in backhaul mode and is connected with other cluster members
- Alternating green and amber: Wireless interface is in backhaul mode and is searching for other cluster members

Mounting the SmartPath AP (LWN602HA)

Using the mounting plate and track clips, you can mount the SmartPath AP to the tracks of a dropped ceiling grid. Using just the mounting plate, you can mount the SmartPath to any flat surface that can support its weight (3.3 lb., 1.5 kg). Both mounting options are explained below.

Note: *In addition to these methods, you can also mount the SmartPath AP on a table using the set of four rubber feet that ship with the product. Simply peel the rubber feet off the adhesive sheet and press them against the underside of the SmartPath AP in its four corners.*

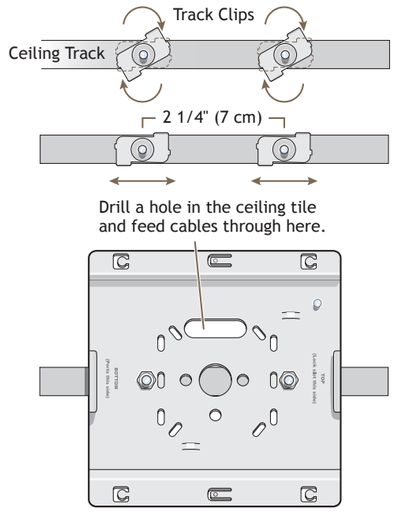
Ceiling Mount

To mount the SmartPath AP LWN602HA to a standard 1" (2.54 cm) wide track in a dropped ceiling, you need the mounting plate, two track clips, and two Keps® nuts that ship with the SmartPath (LWN602HA). You also need a drill, a wrench, and—most likely—a ladder. For narrower tracks 1/2" to 9/16" (1.27 - 1.43 cm) wide, contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.

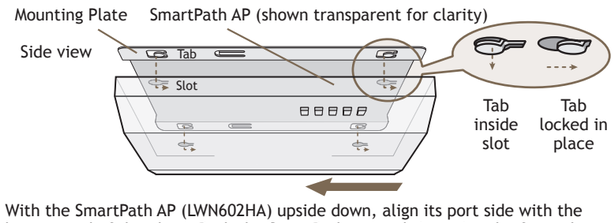
Nudge the ceiling tiles slightly away from the track to clear some space. Attach the track clips to the ceiling track, and then fasten the mounting plate to the clips. When you have the mounting plate in the correct location, cut or drill a hole in the ceiling through which you can then pass the Ethernet and power cables.

1. Press the track clips against the ceiling track and swivel them until they snap into place, gripping the edges of the track. If necessary, slide one or both of the clips along the track to position them at the proper distance (2 1/4" or 7 cm) to fit through the holes in the mounting plate.
2. Insert the mounting plate over the screws attached to the track clips, and use the Keps nuts to fasten the plate firmly to the threaded studs on the clips. Use a wrench to tighten the nuts firmly to the bolts and secure the plate to the track.
3. Through the oblong opening in the plate, drill a hole in the ceiling tile (not shown). Then pass one or both Ethernet cables through the hole, and if you plan to supply power from an AC power source rather than through PoE, pass the power cable through as well.

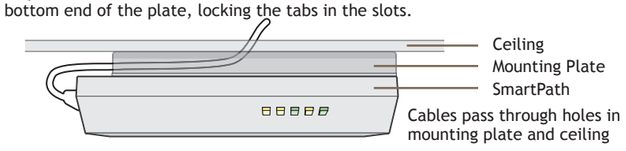
Worm's eye view with ceiling tiles removed for clarity



Attach the SmartPath AP (LWN602HA) to the mounting plate and connect the cables. (Note: You can tie the cables to the tie points [small arched strips] on the mounting plate to prevent them from being pulled out of their connections accidentally.)



4. With the SmartPath AP (LWN602HA) upside down, align its port side with the bottom end of the plate. Push the SmartPath upward, inserting the four tabs on the plate into the four slots on the SmartPath. Slide the SmartPath toward the bottom end of the plate, locking the tabs in the slots.



5. Attach the antennas and connect the cables to complete the installation.

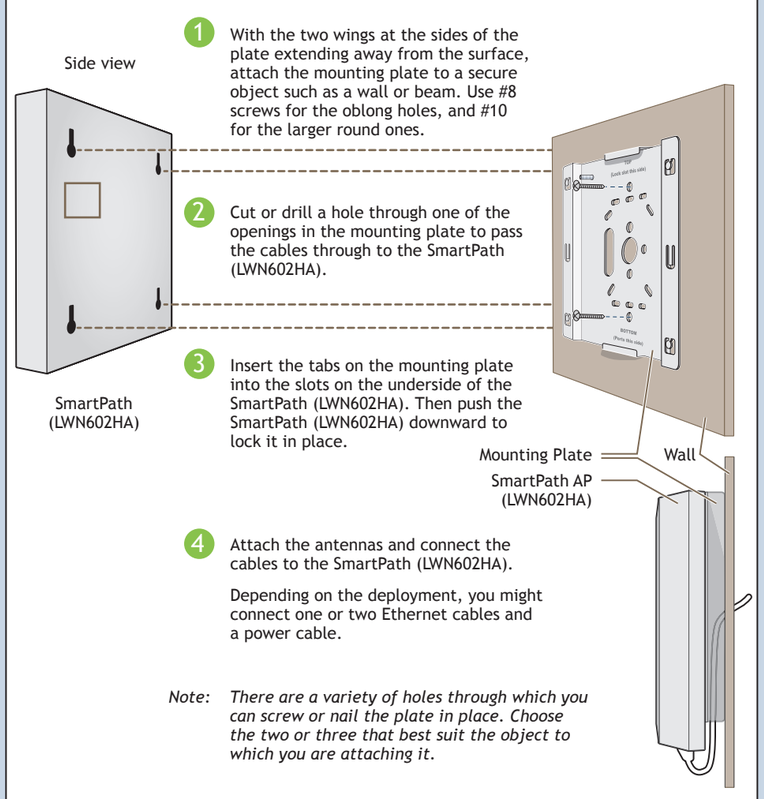
When done, adjust the ceiling tiles back into their former position.

Surface Mount

You can use the mounting plate to attach the SmartPath AP (LWN602HA) to any surface that supports its weight, and to which you can screw or nail the plate. First, mount the plate to the surface. Then, through the large opening in the lower part of the plate, make a hole in the wall so that you can pass the cables through to the SmartPath AP.

Finally, attach the device to the plate, and connect the cables.

Mount the SmartPath (LWN602HA) on a wall as explained below.



1. With the two wings at the sides of the plate extending away from the surface, attach the mounting plate to a secure object such as a wall or beam. Use #8 screws for the oblong holes, and #10 for the larger round ones.
2. Cut or drill a hole through one of the openings in the mounting plate to pass the cables through to the SmartPath (LWN602HA).
3. Insert the tabs on the mounting plate into the slots on the underside of the SmartPath (LWN602HA). Then push the SmartPath (LWN602HA) downward to lock it in place.
4. Attach the antennas and connect the cables to the SmartPath (LWN602HA).

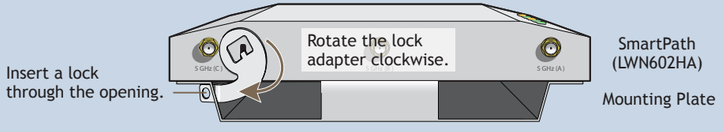
   Depending on the deployment, you might connect one or two Ethernet cables and a power cable.

Note: There are a variety of holes through which you can screw or nail the plate in place. Choose the two or three that best suit the object to which you are attaching it.

Locking the SmartPath AP LWN602HA

To lock the SmartPath AP (LWN602HA) to the mounting plate, use either a Kensington lock or the lock adapter that is included with the mounting kit and a small padlock (not included). To use a Kensington lock, loop the cable attached to the lock around a secure object, insert the T-bar component of the lock into the device lock slot on the SmartPath AP, and then turn the key to engage the lock mechanism. To use the lock adapter, follow the steps below:

1. Insert the security screw through the hole in the SmartPath AP and begin to thread it into the hole in the mounting plate.
2. With the insert bit in a screwdriver, tighten the screw into place, securing the SmartPath AP to the mounting plate.



Deployment and Configuration Tips

The following are some tips and suggestions to help you troubleshoot a few common problems that might arise when setting up the SmartPath (LWN602HA):

- Make sure that you connect the larger antennas to the 2.4-GHz connectors and the smaller ones to the 5-GHz connectors.
- If you manage the SmartPath AP through SmartPath EMS Online and it does not show up on the Monitor > Access Points > SmartPath APs page, do the following:
  - Check connectivity to SmartPath EMS Online: **ping smartpath.blackbox.com**
  - Make sure that any intervening firewalls allow one of the following sets of services from the SmartPath AP to SmartPath EMS Online:
    CAPWAP (UDP 12222), SSH (TCP 22), and HTTPS (TCP 443)
    or
    HTTP (TCP 80) and HTTPS (TCP 443)
- If a client cannot form an association, check that the client is within range and that it is configured to use the same authentication method as the SSID. For example, if the client is configured to use Open or WEP authentication but the SSID is set for WPA or WPA2, the client will not be able to associate with the SmartPath AP. To see the security settings an SSID, click **WLAN > Configure WLAN/SSID**, and look at the key management, encryption and authentication methods, and SSID type listed at the bottom of the page.
- If a client associates and authenticates itself, but the SmartPath AP cannot forward traffic, check that the SmartPath AP is assigning the correct user profile and, if so, that it is also assigning the correct VLAN. To see the user profile and VLAN that a SmartPath AP assigns a client, enter show `ssid <string> station`, and check the UPID (user profile ID) and VLAN columns. If those are correct, then check that the client has received its network settings through DHCP. To check connectivity to the DHCP server, make a console or an SSH connection to the SmartPath AP, send a probe, and see if it elicits a response: `interface mgt0 dhcp-probe-vlan-range <vlan1> <vlan2>`. Also check that the VLAN configuration for the port on the connecting switch is correct.

To remove all settings and return to factory default settings, enter the `reset config` command or use a pin to press the Reset button on the chassis and hold it down for five seconds.

Where to Go for More Information

Technical Documentation

Black Box provides various technical documents for its products. For information about CLI commands, see the CLI reference guides available in HTML format. For information about SmartPath EMS Appliance and SmartPath AP hardware and software topics, see the *SmartPath Deployment Guide* (PDF). The deployment guide contains information about SmartPath APs and SmartPath EMS appliances, WLAN deployment considerations, and detailed configuration instructions for commonly used features.

SmartPath EMS Appliance Help System

The SmartPath EMS Appliance Help System contains a wealth of information about all the features you can configure through SmartPath EMS Appliance. To access it, click the Help icon in the upper right corner of the GUI. A Help topic that pertains to the currently active GUI page appears. To see other Help topics, use the table of contents to browse the system or the search tool to find information about a specific subject.

Support Site

Access technical support services, documentation, and software at ftp://ftp.blackbox.com. You can contact Black Box Tech Support for assistance through the Web site at www.blackbox.com, by e-mail at info@blackbox.com, or by phone at 724-746-5500.

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